

**Notice of Allowability**

Application No.

10/708,281

Examiner

Angela M. Lie

Applicant(s)

CHISTYAKOV, ROMAN

Art Unit

2821

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3/8/2006.
2. ☒ The allowed claim(s) is/are 1-47.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None- of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
WILSON LEE  
PRIMARY EXAMINER

## DETAILED ACTION

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with Kurt Rauschenbach on March 27, 2006.

In claim 1, line 8, after "voltage pulse", insert --having at least one of a controlled amplitude and a controlled rise time that prevents forming an arc between the anode and the cathode assembly, the multi-stage voltage pulse--.

In claim 21, line 6, after "voltage having", insert --at least one of a controlled amplitude and a controlled rise time that prevents forming an arc between the anode and the cathode assembly, the--.

In claim 21, line 7, after "assembly, the", remove "a".

In claim 21, line 7, after "magnitude and", replace "a" with --the--.

In claim 21, line 11, after "having", remove "a".

In claim 21, line 11, after "having", insert --at least one of a controlled amplitude and a controlled rise time that prevents forming an arc between the anode and the cathode assembly, the--.

In claim 21, line 13, after "magnitude and", replace "a" with --the--.

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In claim 21, line 13, after "rise time", remove "that is".

In claim 21, line 13, after "rise time", insert --of the second voltage being--.

In claim 38, line 4, after "cathode assembly", insert --with at least one of a controlled amplitude and a controlled rise time that prevents forming an arc between the anode and the cathode assembly--.

In claim 38, line 8, after "sufficient to ignite", replace "an initial" with --a weakly-ionized--.

In claim 38, line 10, after "distribution in", replace "initial" with -- weakly ionized--.

In claim 38, line 12, remove "that is sustained for greater than 200usec".

In claim 47, line 6, after "higher energies", insert --by controlling at least one of an amplitude and a rise time of a voltage applied between the anode and the cathode assembly to prevent forming an arc between the anode and the cathode assembly,--.

In claim 47, line 8, remove "that" and "increase".

In claim 47, line 8, after "cathode assembly", insert --the voltage--.

In claim 47, before "an ionization", insert --increasing--.

### ***Allowable Subject Matter***

3. Claims 1-47 are allowed.

4. The following is an examiner's statement of reasons for allowance:

As to claim 1, the prior art fails to teach a strongly-ionized plasma generator comprising: a chamber, an anode, a cathode and a multi-stage voltage pulse inducing the formation of plasma inside the chamber, wherein the voltage pulse has two picks

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and at least one of a controlled amplitude and a controlled rise time that prevents forming an arc between the anode and the cathode assembly.

As to claims 2-20, those claims are allowed by the virtue of their dependency on claim 1.

As to claim 21, the prior art fails to teach a method of generating a strongly-ionized plasma, wherein the method comprises: supplying gas proximate to an anode and cathode assembly, forming plasma by multi-stage voltage pulse having two picks and at least one of a controlled amplitude and a controlled rise time that prevents forming an arc between the anode and the cathode assembly.

As to claims 22-37, those claims are allowed by the virtue of their dependency on claim 21.

As to claim 38, the prior art fails to teach a method of generating a strongly-ionized plasma, wherein the method comprises: supplying gas proximate to cathode and anode assembly, forming plasma by multi-stage voltage pulse having two picks and at least one of a controlled amplitude and a controlled rise time that prevents forming an arc between the anode and the cathode assembly.

As to claims 39-46, those claims are allowed by the virtue of their dependency on claim 38.

As to claim 47, the prior art fails to teach an apparatus for generating strongly ionized plasma comprising: an anode a cathode assembly and forming plasma by multi-stage voltage pulse having two picks and at least one of a controlled amplitude and a

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controlled rise time that prevents forming an arc between the anode and the cathode assembly.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***The Prior Art***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US Patent 5,616,224 discloses an apparatus for reducing the intensity and frequency of arcs, which occur during a sputtering process. The device comprises an anode and a cathode inside a chamber, however this prior art does not specifically teach that there should be to voltage picks present in order for the transitions to take place. Furthermore, the reference also teaches the usage of reversed or interrupted voltage in order to suppress arc formation, while the present application teaches controlling the rise time and/or magnitude of the voltage pulse in order to prevent forming an arc.
- US Publication 2005/0092596 discloses a method and apparatus for plasma generation, wherein the apparatus that performs the method comprises an anode and a cathode inside a chamber. This prior art

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teaches arc suppression by using a magnetic field having high strength.

That in fact is different from the current invention that teaches controlling the rise and/or magnitude of the voltage pulse in order to prevent arc formation.

- US Patent 6416634 discloses a method and apparatus for reducing target arcing during sputter deposition comprising an anode, a cathode inside a chamber. Furthermore, this prior art also teaches preventing arc formation by venting of trapped gas from sealing surfaces, and this is in fact different way of reducing arc formation than the one claimed in current application.
- US Patent 6296742 discloses an apparatus for forming plasma without arc suppression.

### ***Inquiry***


6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela M. Lie whose telephone number is 571-272-8445. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on 571-272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**Angela M Lie**

  
**WILSON LEE**  
**PRIMARY EXAMINER**

Vol 271-303

107042925

Pat. Final  
Paragraph

I-V(volts), I (amps), P(kW)

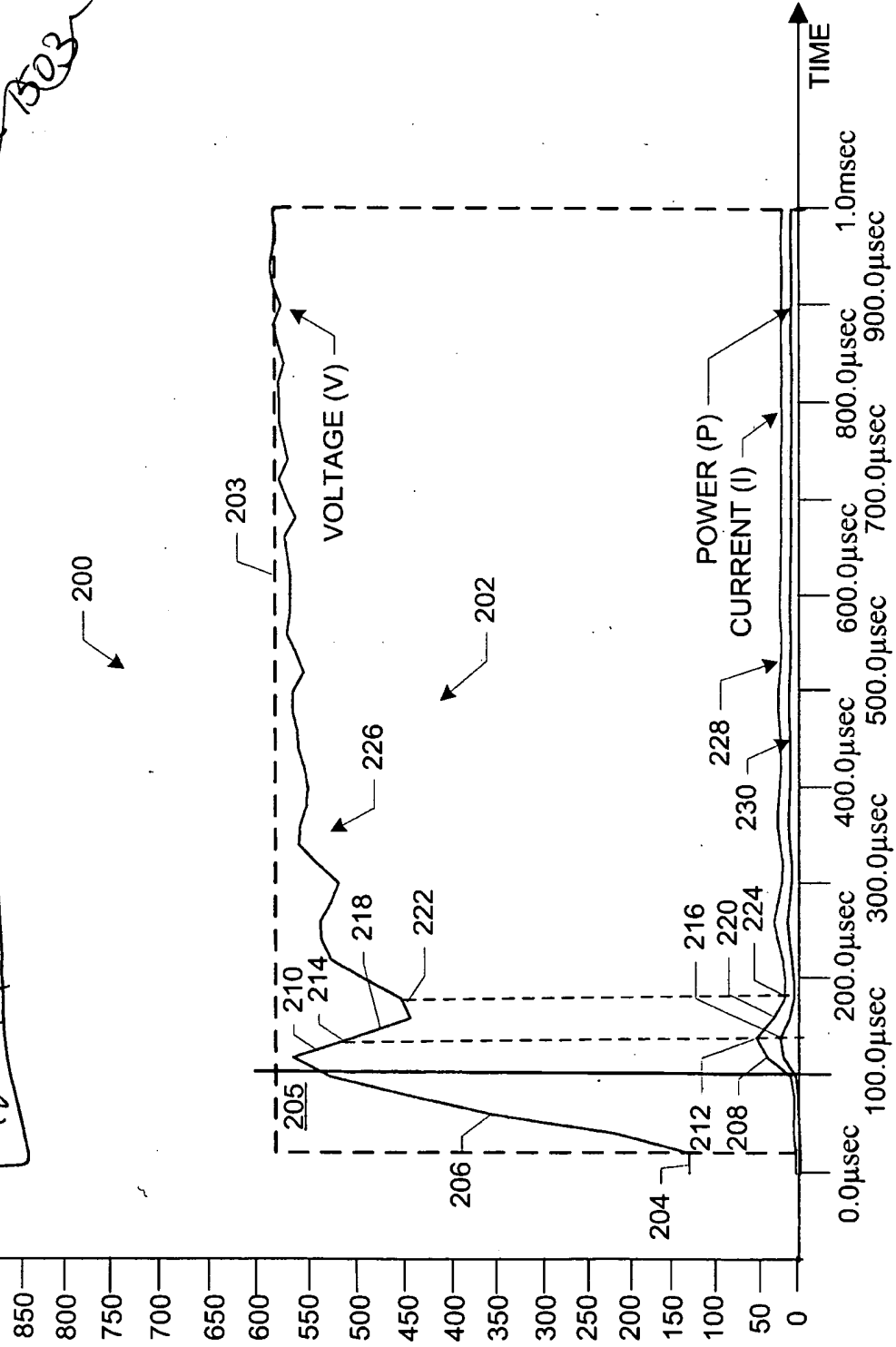


FIG. 3